LOS ALAMOS

ENVIRONMENTAL RESTORATION PROGRAM
INTERIM CHANGE NOTICE

EFFECTIVE DATE : (Dist. Date) 06/10/96 ICN No. 016 Page 1 of 1

Document No. LANL-ER-SOP-10.10 **Rev.** 0 **Title:** Radiation Scoping Surveys

Reason for Change:

The title page is missing part of the title. The complete title is reflected on the table of contents page and on page 2 of the procedure.

Description of Change

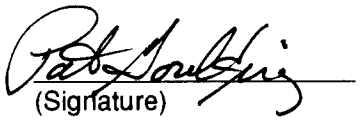
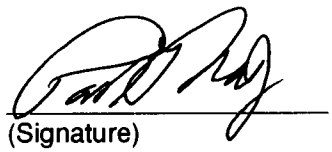
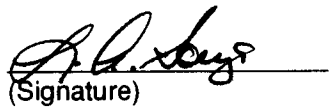
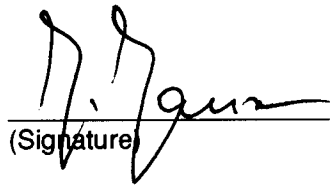
Change title page to read:
RADIATION SCOPING AND BACKGROUND SURVEYS

Change Requested by:	DAVID BRADBURY (Print)	(Signature)	5/28/96 (Date)
Technical Reviewer	PATRICIA M TILLERY (Print)	Patricia M Tillery (Signature)	5/24/96 (Date)
Quality Program Project Manager	LAWRENCE A. SOUZA (Print)	(Signature)	5/28/96 (Date)
ER Project Manager	G.R. ALLEN (Print)	GR Allen (Signature)	28 May 96 (Date)

K96080.FRM

Los Alamos National Laboratory Environmental Restoration Project Standard Operating Procedure	No: LANL-ER-SOP-10.10	Rev: 0

RADIATION SCOPING SURVEYS

Prepared by	JOHN MANN (Print Name)	 (Signature)	6-20-95 (Date)
Quality Review by	PAT GOULDING (Print Name)	 (Signature)	9-20-95 (Date)
Technical Review by	PAT LA FRATE (Print Name)	 (Signature)	8/15/95 (Date)
QPPL Approval	Lawrence A. Souza (Print Name)	 (Signature)	11/20/95 (Date)
PM Approval	JORG JANSEN (Print Name)	 (Signature)	11-21-95 (Date)

Effective Date: 11/27/95

RADIATION SCOPING AND BACKGROUND SURVEYS

Contents

RADIATION SCOPING AND BACKGROUND SURVEYS

1.0 PURPOSE

This procedure describes the conduct of radiation scoping surveys as defined in the Nuclear Regulatory Commission's *Manual for Conducting Radiological Surveys in Support of License Termination.* These surveys are direct measurements of radiation exposure rates and surface activity levels to determine the extent of ground and soil contamination.

2.0 SCOPE

2.1 Applicability

This procedure applies to the use of field survey meters for determining surface soil radioactivity levels and general-area radiation exposure rates at Los Alamos National Laboratory (Laboratory) Environmental Restoration (ER) Project sites.

Part of the scoping survey consists of directly measuring exposure rates and surface activity levels in areas considered to be the most likely to contain residual activity from US Department of Energy (DOE) operations. After locations that may require decontamination have been identified, a characterization survey is performed to define more precisely the extent and magnitude of contamination.

2.2 Training

Radiation surveys are to be conducted only by qualified radiological screening personnel, health physics technicians, or radiation control technicians. Training requirements for these positions are specified in the generic ER Project Health and Safety Plan.

3.0 DEFINITIONS AND ACRONYMS

A. Characterization Survey: Facility or site sampling, monitoring, and analysis activities to determine the extent and nature of contamination. Characterization provides the basis for acquiring the necessary technical information to develop, analyze, and select appropriate cleanup techniques.

B. Scoping Survey: A survey conducted to identify which radionuclides are present as contaminants, the relative ratios in which they occur, and the general levels and extent of the contaminants.

4.0 BACKGROUND AND/OR CAUTIONS

4.1 Scoping Surveys

Site investigations require a standard method for instrumentation use and background determination in the conduct of radiation scoping surveys in the field.

General radiation-exposure measurements are made approximately 1 meter (m) above the ground surface at previously selected survey grid points to determine the relative exposure rate at the grid point. The absolute value of exposure rates obtained is not important.

This survey is *not* for health and safety purposes. Its purpose is to establish relative rates of radioactivity for making comparisons for sampling purposes; therefore, an accurate calibration with a certified source, although desirable, is not essential. (Health and safety surveys are done prior to the scoping survey to establish the need for radiological areas and personnel control measures).

Radiation surveys at the soil surface are made when low-energy gamma- and x-ray-emitting radioisotope contaminants (such as plutonium [Pu] and americium [Am]) is suspected to be in the soil. These surveys locate the areas where soil samples will be taken later for a *quantitative* measurement of the contaminant in the soil.

The technical requirements for determining background measurements and calculating the decision levels or applying these measurements to sample and survey point measurements are discussed in LANL-ER-SOP-10.07, Field Monitoring for Surface and Volume Radioactivity Levels.

4.2 Background Surveys

Background measurements must be made according to a strict process that takes into account the random variability in radiation levels from natural radioactivity at different locations and times in the Laboratory area.

Radiation background measurements are also made at the surface and at 1 m above the ground surface with the same instruments used for the survey point measurements. However, these measurements are made in locations *adjacent* to the survey area locations that are unaffected by the suspected contaminant or radiation source. The object of the survey is to compare a background with several survey grid points to see if there is a *net* activity or exposure value that indicates contamination from the previous DOE activity.

The background area used should be located as close as possible to a group of survey points and yet be far enough away so that the background is not influenced by possible contamination. This means that the background measuring points will retain their validity by moving with the survey points as the survey progresses

through its target area. This will also ensure that daily and location-dependent background variations will be considered.

5.0 EQUIPMENT

5.1 Survey Equipment for Soil Suspected of Plutonium or Americium Contamination

- Ludlum Model 2221 Scaler/Ratemeter
- Teledyne Isotopes (or equal) NAI(Tl) FIDLER detector

5.2 Survey Equipment for Other Gamma-Ray Radioisotope Contaminants

- Ludlum Model 12 Survey Meter
- Ludlum Model 44-10 2 x 2 Gamma Scintillator

Other manufacturers' instruments equivalent to the above may be used.

6.0 PROCEDURE

6.1 Instrument Operational Checks

Before starting the survey, perform the operational checks on the instruments to be used for background and survey point measurements according to the ER-Health Physics Method procedure listed for that instrument.

6.2 Background Measurements

A. Using the Model 44-10 detector with the Model 12 survey meter, and the FIDLER with the Model 2221 Scaler/Ratemeter (if the FIDLER is to be used for the survey point scoping or characterization survey), do the following:

- Perform a general radiation survey around the perimeter of the area suspected of being contaminated to determine how close background measuring locations can be to the survey area without being affected by the suspected contamination. Establish several background measuring locations to be used as the selected survey points are measured.

- Take the first background measurement in the vicinity of the radiation survey starting point, using the same instrument (or both instruments) that will be used to measure the survey points. Hold the 44-10 at waist level (approximately 1 m above the ground). When the FIDLER is used, hold the detector probe face approximately 2 cm above the ground surface.

- If part of the survey area is covered with asphalt or some other artificial surface, make sure that the corresponding backgrounds are measured

over a similarly covered area. This will ensure that radiation from background activity in the area is similarly shielded in both areas.

B. As you progress through the survey area taking point measurements, take one background measurement approximately every hour by coming out of the survey area, going to the preselected background measuring location nearby, and taking a background measurement. This may require many exits from and reentrances to the survey area as the points are measured.

- Record each background measurement value on a data sheet, along with the group of survey point values to which it corresponds. The background values will each be subtracted from its corresponding series of survey point values when the data are analyzed.

- Subtract only one value from the corresponding survey point values if the background measurements are within ± 25% of each other (this means they are essentially equal). If a greater variation in background activity exists among the measurement points, use the appropriate background value for each group of survey points.

6.3 Survey Point Radiation Measurements

A. Measure each selected survey point using the same technique as in step A above. Record on the data sheet the count rate from the 44-10 detector (and the FIDLER, if used).

B. Approximately every hour, move to the nearby background location and take one measurement using the same technique as the survey point measurement. Record the value on the data sheet.

6.4 Quality Assurance

A. Check each field instrument with a standard check source, independent of the calibration source, before use. The value found for this check source must agree with the calibration source by ± 10%.

Enter all values measured for this check source (even those outside the 10% criteria) on the checksheets per LANL-ER-SOP-10.07 and the appropriate ER and ESH Division standard operating procedures (SOPs).

7.0 RECORDS

The technician conducting the survey completes the documentation and submits it to the Field Team Leader. The checksheets in LANL-ER-SOP-10.07 must be completed and managed in accordance with the procedure. The checksheets in the appropriate instrument operational check SOP must be completed in accordance with procedure requirements and copies sent to the ER Records Processing Facility.

8.0 REFERENCES

U.S. Nuclear Regulatory Commission, "Manual for Conducting Radiological Surveys in Support of License Termination", NUREG/CR-5849, June 1992.

LANL-ER-SOP-10.07, Field Monitoring for Surface and Volume Radioactivity Levels.

LANL-ER Project Generic Health and Safety, Plan R0, March 25, 1995.

LaFrate, P., "ER Project Health Physics Methods," LANL memorandum 95-ESH-1-ER/D&D-003. to Distribution, July 14, 1995.